



# STIC Search Report

**EIC 1700**

STIC Database Tracking Number: 106810

TO: Laura Weiner

Location:

Art Unit : 1745

November 3, 2003

Case Serial Number: 10/030143

From: John Calve

Location: EIC 1700

CP3/4-3D62

Phone: 308-4139

John.Calve@uspto.gov

## Search Notes

✓

=> file reg

FILE 'REGISTRY' ENTERED AT 09:42:47 ON 03 NOV 2003  
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Property values tagged with IC are from the ZIC/VINITI data file  
provided by InfoChem.

STRUCTURE FILE UPDATES: 31 OCT 2003 HIGHEST RN 611606-12-3  
DICTIONARY FILE UPDATES: 31 OCT 2003 HIGHEST RN 611606-12-3

TSCA INFORMATION NOW CURRENT THROUGH JULY 14, 2003

Please note that search-term pricing does apply when  
conducting SmartSELECT searches.

Crossover limits have been increased. See HELP CROSSOVER for details.

Experimental and calculated property data are now available. See HELP  
PROPERTIES for more information. See STNote 27, Searching Properties  
in the CAS Registry File, for complete details:  
<http://www.cas.org/ONLINE/STN/STNOTES/stnotes27.pdf>

=> d his

(FILE 'HOME' ENTERED AT 08:50:48 ON 03 NOV 2003)

FILE 'LREGISTRY' ENTERED AT 08:51:00 ON 03 NOV 2003

L1 STR

FILE 'REGISTRY' ENTERED AT 08:58:55 ON 03 NOV 2003

L2 SCR 2043 OR 1918

L3 SCR 72 OR 35 OR 1135

L4 0 S L1 NOT (L2 OR L3)

L5 25 S L1 AND L3 NOT L2

FILE 'LREGISTRY' ENTERED AT 09:00:56 ON 03 NOV 2003

L6 SCR 2036

FILE 'REGISTRY' ENTERED AT 09:06:13 ON 03 NOV 2003

L7 20 S L1 AND L3 NOT (L2 OR L6)

L8 SCR 1992

L9 43 S L1 AND L3 NOT (L2 OR L8)

L10 11638 S L1 AND L3 NOT (L2 OR L8) FULL

SAVE L10 WEINER143/A

FILE 'HCA' ENTERED AT 09:09:59 ON 03 NOV 2003

L11 28368 S L10

L12 627613 S CATHOD? OR ELECTROD###

L13 216868 S ANOD?

L14 241246 S FUELCELL? OR BATTERY? OR BATTERIES? OR (FUEL? OR ELECTROCHEM?

L15 6662 S NONAQU## OR NON(W)AQUEO?

L16 6684 S NONAQU## OR NON(W)AQU?

L17 89 S L11 AND L14

L18 19 S L17 AND L12

L19 0 S L18 AND L16

L20 1018459 S AQUEOUS? OR SOLID?(2N)ELECTROLYT?

L21 1 S L18 AND L20

FILE 'LREGISTRY' ENTERED AT 09:14:38 ON 03 NOV 2003

FILE 'HCA' ENTERED AT 09:17:14 ON 03 NOV 2003  
E US20030068561/PN

L22 1 S E3

FILE 'LCA' ENTERED AT 09:18:03 ON 03 NOV 2003  
53 S NONAQU? OR NON#(W)AQU?

L23

FILE 'HCA' ENTERED AT 09:21:55 ON 03 NOV 2003

L24 22935 S L23

L25 2 S L18 AND L24

L26 4 S L17 AND L24

L27 67444 S L14(2N)(ELECTROLYT? OR L24)

L28 22 S L11 AND L27

L29 513662 S 52/SC,SX OR 72/SC,SX

L30 21 S L28 AND L29

FILE 'LCA' ENTERED AT 09:24:10 ON 03 NOV 2003

L31 74 S NONAQ###

FILE 'HCA' ENTERED AT 09:25:42 ON 03 NOV 2003

L32 29583 S L31

L33 7 S L30 AND L32

L34 14 S L30 AND (L12 OR L13)

L35 15 S L11(2N)(L12 OR L13)

L36 339703 S (LITHIUM# OR LI)

L37 3 S L35 AND L36

L38 11 S (L33 OR L34 OR L35) AND L36

L39 24 S (L33 OR L34 OR L35) AND L29

L40 28 S (L33 OR L34 OR L35)

L41 9 S L25 OR L26 OR L33 OR L37

FILE 'LCA' ENTERED AT 09:29:44 ON 03 NOV 2003

L42 1 S (LITHIUM# OR LI)(N)?FLUOROPHOSPHAT?

FILE 'HCA' ENTERED AT 09:31:40 ON 03 NOV 2003

L43 20064 S ?FLUOROPHOSPHAT?

L44 908308 S ?PHOSPHAT?

L45 7503 S (LI OR LITHIUM#)(2N)L44

L46 6 S (L33 OR L34 OR L35) AND L45

L47 9 S L41 OR L46

L48 28 S L34 OR L35 OR L38

L49 19 S L48 NOT L47

L50 5 S L47 AND 1907-2000/PY,PRY

L51 18 S L49 AND 1907-2000/PY,PRY

L52 4 S L47 NOT L50

FILE 'LCA' ENTERED AT 09:35:53 ON 03 NOV 2003

L53 25 S CATHODOLUMIN?

L54 4207 S 22/SC,SC OR 28/SC,SX OR 9/SX,SC

FILE 'HCA' ENTERED AT 09:40:39 ON 03 NOV 2003

L55 2 S L51 AND L53

L56 1300068 S L54

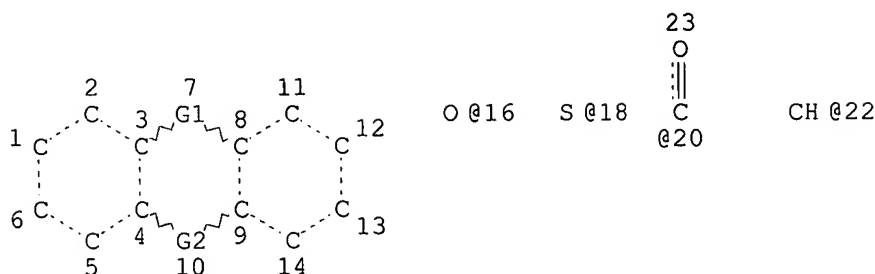
L57 4 S L51 AND L56

L58 5 S L55 OR L57

L59 13 S L51 NOT L58

FILE 'REGISTRY' ENTERED AT 09:42:47 ON 03 NOV 2003

=> d que stat L10  
L1 STR



VAR G1=16/18/20  
REP G2=(0-2) 22  
NODE ATTRIBUTES:  
DEFAULT MLEVEL IS ATOM  
DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
RSPEC 12  
NUMBER OF NODES IS 19

STEREO ATTRIBUTES: NONE  
L2 SCR 2043 OR 1918  
L3 SCR 72 OR 35 OR 1135  
L8 SCR 1992  
L10 11638 SEA FILE=REGISTRY SSS FUL L1 AND L3 NOT (L2 OR L8)

100.0% PROCESSED 268765 ITERATIONS 11638 ANSWERS  
SEARCH TIME: 00.00.07

=> file hca  
FILE 'HCA' ENTERED AT 09:43:05 ON 03 NOV 2003  
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.  
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FILE COVERS 1907 - 31 Oct 2003 VOL 139 ISS 19  
FILE LAST UPDATED: 31 Oct 2003 (20031031/ED)

This file contains CAS Registry Numbers for easy and accurate substance identification.

=> d L50 1-5 ibib abs hitind hitstr

L50 ANSWER 1 OF 5 HCA COPYRIGHT 2003 ACS on STN  
ACCESSION NUMBER: 136:56423 HCA  
TITLE: Secondary lithium battery  
INVENTOR(S): Shimizu, Takehiro; Kuratomi, Itaru; Tatsumi, Kuniaki;  
Sakai, Tetsuo  
PATENT ASSIGNEE(S): Nippon Steel Chemical Co., Ltd., Japan; Sangyo Gijutsu  
Sogo Kenkyusho  
SOURCE: Jpn. Kokai Tokkyo Koho, 5 pp.  
CODEN: JKXXAF  
DOCUMENT TYPE: Patent  
LANGUAGE: Japanese  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2001357876	A2	20011226	JP 2000-177052	20000613 <--
PRIORITY APPLN. INFO.:			JP 2000-177052	20000613 <--

AB The battery has a Li compound **cathode**, a Li intercalating **anode**, a separator, and a **nonaq.** Li salt electrolyte solution containing 1-10% of an aromatic overcharge inhibitor; where a stainless steel **electrode** and a Li **electrode**, with a glass separator in between, shows maximum current densities  $\leq 5 \mu\text{A}/\text{cm}^2$  and  $\geq 25 \mu\text{A}/\text{cm}^2$ , at 4.0-4.2V and 4.5-4.7V, resp., when scanned at 5 mV/s between 3.0-5.0V in a 1M LiPF<sub>6</sub>/1:1 (volume) ethylene carbonate-di-Me carbonate solution containing 2% of the inhibitor. The inhibitor is selected from naphthalene, benzyl biphenyl, and diphenylene oxide.

IC ICM H01M010-40  
ICS G01N027-416

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

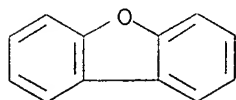
IT **Battery electrolytes**  
(**electrolyte** solns. containing aromatic overcharge inhibitors for secondary lithium batteries)

IT 91-20-3, Naphthalene, uses 92-52-4, Biphenyl, uses 132-64-9, Diphenylene oxide 606-97-3, o-Benzyl biphenyl 613-42-3, p-Benzyl biphenyl 790-22-7  
RL: MOA (Modifier or additive use); USES (Uses)  
(aromatic overcharge inhibitors in electrolyte solns. for secondary lithium batteries)

IT 96-49-1, Ethylene carbonate 616-38-6, Dimethyl carbonate 21324-40-3, **Lithium hexafluorophosphate**  
RL: DEV (Device component use); USES (Uses)  
(electrolyte solns. containing aromatic overcharge inhibitors for secondary lithium batteries)

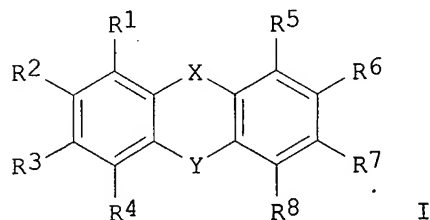
IT 132-64-9, Diphenylene oxide  
RL: MOA (Modifier or additive use); USES (Uses)  
(aromatic overcharge inhibitors in electrolyte solns. for secondary lithium batteries)

RN 132-64-9 HCA  
CN Dibenzofuran (8CI, 9CI) (CA INDEX NAME)



L50 ANSWER 2 OF 5 HCA COPYRIGHT 2003 ACS on STN  
ACCESSION NUMBER: 136:9102 HCA  
TITLE: **Nonaqueous** electrolyte solution and  
secondary **battery** using the solution  
INVENTOR(S): Okahara, Kenji; Shima, Noriko; Suzuki, Hitoshi  
PATENT ASSIGNEE(S): Mitsubishi Chemical Corporation, Japan  
SOURCE: PCT Int. Appl., 22 pp.  
CODEN: PIXXD2  
DOCUMENT TYPE: Patent  
LANGUAGE: Japanese  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2001091223	A1	20011129	WO 2001-JP4406	20010525 <--
W: AE, AG, AL, AU, BA, BB, BG, BR, BZ, CA, CN, CO, CR, CU, CZ, DM, DZ, EE, GD, GE, HR, HU, ID, IL, IN, IS, KR, LC, LK, LR, LT, LV, MA, MG, MK, MN, MX, NO, NZ, PL, RO, SG, SI, SK, TT, UA, US, UZ, VN, YU, ZA, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
JP 2001338681	A2	20011207	JP 2000-155772	20000526
AU 2001060622	A5	20011203	AU 2001-60622	20010525 <--
EP 1286409	A1	20030226	EP 2001-934354	20010525 <--
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR				
US 2003068561	A1	20030410	US 2002-30143	20020920 <--
PRIORITY APPLN. INFO.: JP 2000-155772 A 20000526 <-- WO 2001-JP4406 W 20010525				
OTHER SOURCE(S): MARPAT 136:9102 GI				



AB The electrolyte solution contains an organic solvent, a Li salt, and I, where X = -O-, -S-, -CO-, or -SO<sub>2</sub>-; Y = single bond, -CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>-, -CH:CH-, or -CO-, but not both X and Y = -CO- at the same time; R<sub>1</sub>-R<sub>8</sub> = H, alkyl, Ph, halogen group. The **battery** is a secondary Li **battery**.

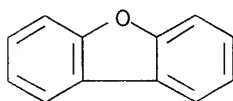
IC ICM H01M010-40  
ICS H01M004-62; H01M004-02; C07D307-91; C07D311-86; C07D335-12

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

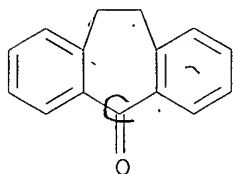
ST secondary lithium **battery** electrolyte soln arom additive

IT **Battery electrolytes**  
(multi-ring aromatic additives in nonaq. electrolyte solns. for

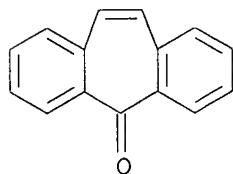
secondary lithium **batteries**)  
IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 21324-40-3,  
**Lithium hexafluorophosphate**  
RL: DEV (Device component use); USES (Uses)  
(multi-ring aromatic additives in **nonaq.** electrolyte solns. for  
secondary lithium **batteries**)  
IT 90-47-1, Xanthone 132-64-9, Dibenzofuran 1210-35-1,  
Dibenzosuberone 2222-33-5, Dibenzosuberone  
RL: MOA (Modifier or additive use); USES (Uses)  
(multi-ring aromatic additives in **nonaq.** electrolyte solns. for  
secondary lithium **batteries**)  
IT 132-64-9, Dibenzofuran 1210-35-1, Dibenzosuberone  
2222-33-5, Dibenzosuberone  
RL: MOA (Modifier or additive use); USES (Uses)  
(multi-ring aromatic additives in **nonaq.** electrolyte solns. for  
secondary lithium **batteries**)  
RN 132-64-9 HCA  
CN Dibenzofuran (8CI, 9CI) (CA INDEX NAME)



RN 1210-35-1 HCA  
CN 5H-Dibenzo[a,d]cyclohepten-5-one, 10,11-dihydro- (6CI, 7CI, 8CI, 9CI) (CA  
INDEX NAME)



RN 2222-33-5 HCA  
CN 5H-Dibenzo[a,d]cyclohepten-5-one (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)



REFERENCE COUNT: 18 THERE ARE 18 CITED REFERENCES AVAILABLE FOR THIS  
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L50 ANSWER 3 OF 5 HCA COPYRIGHT 2003 ACS on STN  
ACCESSION NUMBER: 110:118363 HCA  
TITLE: **Nonaqueous battery**  
INVENTOR(S): Yoshimitsu, Kazumi; Sekido, Shintaro; Kazehara, Kenya;  
Kajita, Kozo; Manabe, Toshikatsu  
PATENT ASSIGNEE(S): Hitachi Maxell, Ltd., Japan  
SOURCE: Eur. Pat. Appl., 18 pp.  
CODEN: EPXXDW  
DOCUMENT TYPE: Patent

LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 296589	A2	19881228	EP 1988-110028	19880623 <--
EP 296589	A3	19900328		
EP 296589	B1	19930901		
R: DE, FR, GB				
JP 64002260	A2	19890106	JP 1987-156948	19870624 <--
JP 01060959	A2	19890308	JP 1987-218435	19870831 <--
US 4888255	A	19891219	US 1988-210927	19880624 <--
PRIORITY APPLN. INFO.:			JP 1987-156948	19870624 <--
			JP 1987-218435	19870831 <--

AB The **battery** comprises an alkali metal anode, a porous carbonaceous **cathode** collector, and a catholyte of an ionically conductive solution of a solute in a solvent containing a liquid oxyhalide.

The electrolyte and/or the collector contains resp. 10-6-10-2M (or 0.05-20%) aromatic compound. The aromatic compound is a carboxylic compound having  $\geq 2$  benzene rings (naphthalene, anthracene, pyrene, 1,2-benzanthracene, perylene, pentacene, triphenylene, benz[a]pyrene, 1,2,3,4-dibenzanthracene, 1,2,5,6-dibenzanthracene, benz[ghi]perylene, coronene) or an O- or S-containing compound having a benzene ring connected to an O- or S-containing ring (2,6-di-tert-Bu-1,4-benzoquinone, 1,8-naphthalic anhydride, 9,10-anthraquinone, dibenzothiophene, benzothiophene, 4-phenylthiophene, thiochroman-4-one, thioxanthene-9-one). The aromatic compds. are chlorinated. Thus, catholytes containing 1.2M LiAlCl<sub>4</sub> and 7 + 10-4M of 1 of the claimed aromatic compds. were used in Li-SOCl<sub>2</sub> **batteries**. The voltages of these **batteries** on discharge through a 10- $\Omega$  load for 50 ms at 20° were 1.502-2.149 V, vs. 1.189 V for a **battery** without the organic compound

IC ICM H01M006-14  
 ICS H01M004-66

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST lithium thionyl chloride **battery**; arom additive lithium **nonaq battery**

IT **Batteries**, primary  
 (lithium-thionyl chloride, with **nonaq.** electrolyte containing aromatic additive)

IT **Cathodes**  
 (**battery**, thionyl chloride, carbonaceous current collector for, aromatic additive-containing)

IT 50-32-8, Benzo[a]pyrene, uses and miscellaneous 53-70-3,  
 1,2,5,6-Dibenzanthracene 56-55-3, 1,2-Benzanthracene 198-55-0,  
 Perylene  
 RL: USES (Uses)

(**cathode** current collector containing, thionyl chloride, for decreasing initial voltage drop of **nonaq. batteries**)

IT 81-84-5, 1,8-Naphthalic anhydride 84-65-1, 9,10-Anthraquinone 91-20-3,  
 Naphthalene, uses and miscellaneous 92-24-0, 2,3-Benzanthracene  
 95-15-8, Benzothiophene 117-08-8 120-12-7, Anthracene, uses and  
 miscellaneous 129-00-0, Pyrene, uses and miscellaneous 132-65-0  
 , Dibenzothiophene 135-48-8, Pentacene 191-07-1, Coronene 215-58-7,  
 1,2,3,4-Dibenzanthracene 492-22-8, Thioxanthene-9-one 719-22-2  
 825-55-8 3528-17-4, Thiochroman-4-one 7061-81-6 15062-66-5,  
 2,3,6,7-Tetrachloroanthraquinone 119493-81-1, 2,4,6-



Trichlorobenzothiophene 119493-82-2, 2,4,7-

Trichlorodibenzothiophene

RL: USES (Uses)

(catholyte containing, lithium-thionyl chloride battery, for decreasing initial voltage drop)

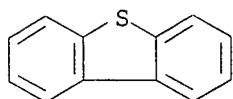
IT 132-65-0, Dibenzothiophene 119493-82-2,  
2,4,7-Trichlorodibenzothiophene

RL: USES (Uses)

(catholyte containing, lithium-thionyl chloride battery, for decreasing initial voltage drop)

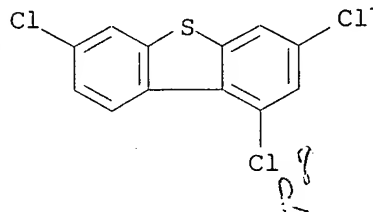
RN 132-65-0 HCA

CN Dibenzothiophene (8CI, 9CI) (CA INDEX NAME)



RN 119493-82-2 HCA

CN Dibenzothiophene, 1,3,7-trichloro- (9CI) (CA INDEX NAME)



L50 ANSWER 4 OF 5 HCA COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 100:71238 HCA

TITLE: Cathode characteristics of organic electron acceptors for lithium batteries

AUTHOR(S): Tobishima, Shinichi; Yamaki, Junichi; Yamaji, Akihiko

CORPORATE SOURCE: Ibaraki Electr. Commun. Lab., Nippon Telegr. and Teleph. Public Corp., Tokai, 319-11, Japan

SOURCE: Journal of the Electrochemical Society (1984), 131(1), 57-63

CODEN: JESQAN; ISSN: 0013-4651

DOCUMENT TYPE: Journal

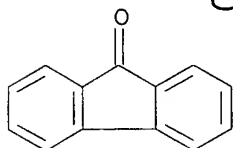
LANGUAGE: English

AB Discharge and charge characteristics of cathode-active materials for Li batteries were studied. Electron acceptors of charge-transfer complex with high electron affinity were examined as cathode-active materials because they were expected to have high cell voltage. The electron acceptors were 2,4,7-trinitro-9-fluorenone (TNF) [129-79-3], 2,4,5,7-tetranitro-9-fluorenone [746-53-2], 7,7,8,8-tetracyanoquinodimethane [1518-16-7], 9,10-phenanthrenequinone [84-11-7], and 13 other compds. Among these compds., TNF showed the highest discharge capacity (1050 A-h/kg) and the highest energy d. (2030 W-h/kg). Cycle lives of TNF were 400 and 54 at charge-discharge capacity of 100 (1.2) and 200 A-h/kg (2.4 electron transfer/mol TNF), resp. The cycle tests indicate reversibility of TNF at ≤2-electron transfer.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology) Section cross-reference(s): 72

ST lithium battery cathode material; trinitrofluorenone cathode lithium battery; tetranitrofluorenone cathode lithium battery; tetracyanoquinodimethane cathode lithium battery;

phenanthranquinone cathode lithium battery  
IT 84-11-7 84-58-2 85-01-8, uses and miscellaneous 86-73-7 89-32-7  
91-15-6 91-20-3, uses and miscellaneous 99-65-0 108-31-6, uses and  
miscellaneous 120-12-7, uses and miscellaneous 129-00-0, uses and  
miscellaneous 129-79-3 198-55-0 486-25-9 583-63-1  
670-54-2, uses and miscellaneous 746-53-2 1518-16-7 2435-53-2  
2435-54-3  
RL: USES (Uses)  
(cathode active material, battery, discharge characteristics  
of)  
IT 486-25-9  
RL: USES (Uses)  
(cathode active material, battery, discharge characteristics  
of)  
RN 486-25-9 HCA  
CN 9H-Fluoren-9-one (9CI) (CA INDEX NAME)



L50 ANSWER 5 OF 5 HCA COPYRIGHT 2003 ACS on STN  
ACCESSION NUMBER: 96:43111 HCA  
TITLE: Lightweight battery  
INVENTOR(S): Tobishima, Shinichi; Yamaki, Junichi; Yamaji, Akihiko  
PATENT ASSIGNEE(S): Nippon Telegraph and Telephone Public Corp., Japan  
SOURCE: Fr. Demande, 31 pp.  
CODEN: FRXXBL  
DOCUMENT TYPE: Patent  
LANGUAGE: French  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
FR 2472277	A1	19810626	FR 1980-26844	19801217 <--
FR 2472277	B1	19840622		
JP 56086465	A2	19810714	JP 1979-163621	19791218 <--
JP 63015702	B4	19880406		
JP 56086466	A2	19810714	JP 1979-163622	19791218 <--
JP 63015703	B4	19880406		
JP 56086467	A2	19810714	JP 1979-163623	19791218 <--
JP 63013307	B4	19880324		
JP 56102071	A2	19810815	JP 1980-3801	19800117 <--
JP 56118272	A2	19810917	JP 1980-21575	19800225 <--
JP 63021311	B4	19880506		
US 4343871	A	19820810	US 1980-213042	19801204 <--
GB 2068631	A	19810812	GB 1980-39292	19801208 <--
GB 2068631	B2	19840516		
DE 3047885	A1	19810924	DE 1980-3047885	19801218 <--
DE 3047885	C2	19840719		
PRIORITY APPLN. INFO.:			JP 1979-163621	19791218 <--
			JP 1979-163622	19791218 <--
			JP 1979-163623	19791218 <--
			JP 1980-3801	19800117 <--

JP 1980-21575

19800225 &lt;--

AB A battery (primary or secondary) was developed in which the anode contains an active material from the Group IA of the Periodic Table, the cathode has an active material chosen from a group of organic compds. having a conjugated system of  $\pi$  electrons, and an electrolyte from a material which does not react chemical with the anode or cathode and permits the migration of ions from the anode to the cathode. For example, a battery is made having a Li anode, a porous polypropylene separator, and a cathode prepared by mixing 2,4,7-trinitro-9-fluorenone [129-79-3] and acetylene black powder with an electrolyte of 1M LiClO<sub>4</sub> dissolved in propylene carbonate. Such a battery can be discharge at 1.57 mA for 59 h until the voltage has fallen to 1 V. The energy d. of the battery is 2.940 W-h/kg.

IC H01M010-36; H01M006-14

CC 72-3 (Electrochemistry)

ST primary secondary **battery nonaq electrolyte**

IT 66-71-7 83-72-7 84-11-7 85-02-9 135-20-6 135-20-6D, copper complex 230-27-3 **486-25-9** 10210-64-7 14024-18-1  
14024-48-7 14710-63-5 21679-46-9 29204-93-1 32982-03-9  
80420-02-6 80430-48-4

RL: PRP (Properties)

(**cathode** active material, with acetylene black for light weight battery)

IT 108-32-7

RL: PRP (Properties)

(electrolyte from **lithium** perchlorate and, for light weight battery)

IT 110-71-4

RL: PRP (Properties)

(electrolyte from **lithium** perchlorate in propylene carbonate and, for light weight battery)

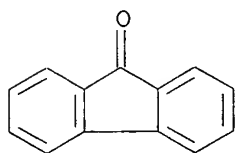
IT **486-25-9**

RL: PRP (Properties)

(**cathode** active material, with acetylene black for light weight battery)

RN 486-25-9 HCA

CN 9H-Fluoren-9-one (9CI) (CA INDEX NAME)



=> d L52 1-4 cbib abs hitind hitstr

(Dates - not good)

L52 ANSWER 1 OF 4 HCA COPYRIGHT 2003 ACS on STN

139:182873 **Lithium** ion battery with improved safety. Chen, Chun-Hua; Hyung, Yoo Eup; Visser, Donald R.; Amine, Khalil (USA). U.S. Pat. Appl. Publ. US 2003157413 A1 20030821 14 pp. (English). CODEN: USXXCO. APPLICATION: US 2002-77569 20020215.

AB A **lithium** battery with improved safety is disclosed that utilizes one or more additives in the **battery electrolyte** solution wherein a **lithium** salt is dissolved in an organic solvent, which may contain propylene carbonate. For example, a blend of 2 wt% tri-Ph phosphate, 1 wt% di-Ph monobutyl phosphate and 2 wt%

vinyl ethylene carbonate additives has been found to significantly enhance the safety and performance of **Li-ion** batteries using a **LiPF<sub>6</sub>** salt in EC/DEC electrolyte solvent. The invention relates to both the use of individual additives and to blends of additives such as that shown in the above example at concns. of 1 to 4-wt% in the **lithium battery electrolyte**. This invention relates to additives that suppress gas evolution in the cell, passivate graphite **electrode** and protect it from exfoliating in the presence of propylene carbonate solvents in the electrolyte, and retard flames in the **lithium** batteries.

IC ICM H01M010-40

NCL 429326000; 429329000; 429328000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST safety improved **lithium** ion battery

IT Battery **anodes**

Fire-resistant materials

Safety

(**lithium** ion battery with improved safety)

IT Secondary batteries

(**lithium**; **lithium** ion battery with improved safety)

IT 89-32-7 108-05-4, Vinyl acetate, uses 302-01-2, Hydrazine, uses 486-25-9, 9-Fluorenone 614-99-3, Ethyl-2-furoate 931-40-8, 4-Hydroxymethyl-1,3-dioxolan-2-one 1025-15-6 4427-96-7, Vinyl ethylene carbonate 4437-80-3, 4,4-Dimethyl-5-methylene-1,3-dioxolan-2-one 14861-06-4, Crotonic acid, vinyl ester 15896-04-5, 4,5-Diethenyl-1,3-dioxolan-2-one 19693-75-5 27797-53-1, 1,3-Dioxolan-2-one, 4,5-diphenyl 40492-31-7, 4-Methoxymethyl-1,3-dioxolan-2-one 51985-12-7 69124-14-7 95348-48-4 95924-48-4 130221-78-2 135159-09-0 148481-75-8 557084-91-0 579490-82-7, 1,4-Dioxo-2-silacyclopentan-5-one 579490-83-8 579490-84-9 581054-51-5 581054-52-6 581054-53-7

RL: MOA (Modifier or additive use); USES (Uses)

(**anode** passivation material; **lithium** ion battery with improved safety)

IT 115-86-6, Triphenyl **phosphate** 463-79-6D, Carbonic acid, cyclic Et ester 2752-95-6, Butyl Diphenyl **phosphate** 7664-38-2D, Phosphoric acid, alkyl Ph ester

RL: MOA (Modifier or additive use); USES (Uses)

(flame retardant; **lithium** ion battery with improved safety)

IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate 616-38-6, Dimethylcarbonate 623-53-0, Ethyl methyl carbonate 1313-99-1, Nickel oxide, uses 1332-37-2, Iron oxide, uses 7782-42-5, Graphite, uses 7791-03-9, **Lithium** perchlorate 10124-54-6, Manganese

**phosphate** 10377-52-3, **Lithium** **phosphate**

10381-36-9, Nickel **phosphate** 10402-24-1, Iron

**phosphate** 11104-61-3, Cobalt oxide 11129-60-5, Manganese oxide

12057-24-8, **Lithium** oxide, uses 14283-07-9, **Lithium**

tetrafluoroborate 17409-91-5, Cobalt **phosphate** 21324-40-3,

**Lithium** hexafluorophosphate 29935-35-1,

**Lithium** hexafluoroarsenate

RL: DEV (Device component use); USES (Uses)

(**lithium** ion battery with improved safety)

IT 88-12-0, n-Vinyl-2-pyrrolidinone, uses 110-54-3D, Hexane, fluoridated

513-08-6, Tripropyl **phosphate** 2528-36-1, Dibutyl phenyl

**phosphate** 4427-92-3, Phenyl ethylene carbonate 23466-13-9,

Phosphoric acid, dibutyl vinyl ester 27460-01-1, Diphenyl propyl

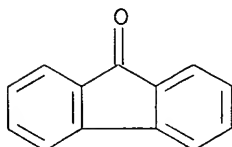
**phosphate** 29383-23-1, Vinylimidazole 38299-59-1, Phenyl

dipropyl **phosphate** 54952-38-4 105234-62-6 114435-02-8,

Fluoroethylene carbonate 171730-81-7 581054-54-8

RL: MOA (Modifier or additive use); USES (Uses)

(lithium ion battery with improved safety)  
IT 486-25-9, 9-Fluorenone  
RL: MOA (Modifier or additive use); USES (Uses)  
(anode passivation material; lithium ion battery  
with improved safety)  
RN 486-25-9 HCA  
CN 9H-Fluoren-9-one (9CI) (CA INDEX NAME)

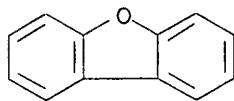


L52 ANSWER 2 OF 4 HCA COPYRIGHT 2003 ACS on STN  
139:39153 Secondary **nonaqueous electrolyte battery**  
. Nishimura, Makiko; Kato, Kiyomi; Koshina, Shigeru; Okahara, Kenji;  
Shima, Noriko; Suzuki, Hitoshi (Matsushita Electric Industrial Co., Ltd.,  
Japan; Mitsubishi Chemical Corp.). Jpn. Kokai Tokkyo Koho JP 2003173820  
A2, 20030620, 6 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP  
2002-272046 20020918. PRIORITY: JP 2001-302385 20010928.  
AB The **battery** has a **nonaq.** electrolyte solution and a stack  
of a Li intercalating **anode**, a separator, and a Li transition  
metal oxide **cathode** containing Co, Ni, and/or Mn; where the  
**electrode** stack has a water content  $\leq 50$  ppm and the  
electrolyte solution contains 0.2-5% biphenylene oxide and/or its derivative  
IC ICM H01M010-40  
ICS H01M004-58  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy  
Technology)  
ST secondary lithium **battery electrode** separator water  
content; biphenylene oxide secondary lithium **battery**  
**electrolyte** soln  
IT Carbonaceous materials (technological products)  
RL: DEV (Device component use); USES (Uses)  
(**electrode**-separator stacks with controlled water content for  
secondary lithium **batteries**)  
IT **Battery electrolytes**  
(**electrolyte** solns. containing biphenylene oxide for secondary  
lithium **batteries**)  
IT 9002-88-4, Polyethylene 12190-79-3, Cobalt lithium oxide (CoLiO<sub>2</sub>)  
RL: DEV (Device component use); USES (Uses)  
(**electrode**-separator stacks with controlled water content for  
secondary lithium **batteries**)  
IT 7732-18-5, Water, miscellaneous  
RL: MSC (Miscellaneous)  
(**electrode**-separator stacks with controlled water content for  
secondary lithium **batteries**)  
IT 96-49-1, Ethylene carbonate 132-64-9, Diphenylene oxide  
623-53-0, Ethyl methyl carbonate 7320-52-7 21324-40-3,  
**Lithium hexafluorophosphate**  
RL: DEV (Device component use); USES (Uses)  
(electrolyte solns. containing biphenylene oxide for secondary lithium  
**batteries**)  
IT 132-64-9, Diphenylene oxide 7320-52-7  
RL: DEV (Device component use); USES (Uses)  
(electrolyte solns. containing biphenylene oxide for secondary lithium

**batteries)**

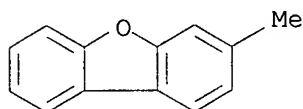
RN 132-64-9 HCA

CN Dibenzofuran (8CI, 9CI) (CA INDEX NAME)



RN 7320-52-7 HCA

CN Dibenzofuran, 3-methyl- (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)



L52 ANSWER 3 OF 4 HCA COPYRIGHT 2003 ACS on STN

138:371789 **Nonaqueous** electrolyte composition for improving overcharge safety of lithium **battery**. Choy, Sang-Hoon; Kim, Ho-Sung; Sun, Hee-Young; Noh, Hyeong-Gon (Samsung SDI Co., Ltd., S. Korea). U.S. Pat. Appl. Publ. US 2003099886 A1 20030529, 10 pp. (English). CODEN: USXXCO. APPLICATION: US 2002-270669 20021016. PRIORITY: KR 2001-64939 20011020.

AB Provided are a **nonaq. electrolyte** for improving **battery** safety by suppressing risks associated with the **battery** becoming overcharged as a result of certain uncontrolled conditions and a lithium **battery** with improved overcharge safety. The **nonaq. electrolyte** includes an organic solvent, a lithium salt, and a biphenylene oxide based compound

IC ICM H01M010-40

NCL 429328000; 429200000; 429329000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST safety improvement lithium **battery nonaq electrolyte** compn; biphenylene oxide additive **electrolyte** lithium **battery**

IT Secondary **batteries**

(lithium; **nonaq. electrolyte** composition for improving overcharge safety of lithium **battery**)

IT **Battery electrolytes**

Safety

Swelling, physical

(**nonaq. electrolyte** composition for improving overcharge safety of lithium **battery**)

IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate 462-06-6, Fluorobenzene 623-53-0, Ethyl methyl carbonate 21324-40-3, Lithium hexafluorophosphate

RL: DEV (Device component use); USES (Uses)

(**nonaq. electrolyte** composition for improving overcharge safety of lithium **battery**)

IT 132-64-9, Dibenzofuran

RL: MOA (Modifier or additive use); USES (Uses)

(**nonaq. electrolyte** composition for improving overcharge safety of lithium **battery**)

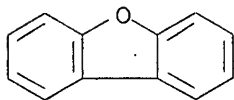
IT 132-64-9, Dibenzofuran

RL: MOA (Modifier or additive use); USES (Uses)

(**nonaq.** electrolyte composition for improving overcharge safety of lithium **battery**)

RN 132-64-9 HCA

CN Dibenzofuran (8CI, 9CI) (CA INDEX NAME)



L52 ANSWER 4 OF 4 HCA COPYRIGHT 2003 ACS on STN

138:58890 **Electrolyte** and secondary **battery**. Shizuka, Kenji; Okahara, Kenji; Shima, Kuniyoshi (Mitsubishi Chemical Corp., Japan). Jpn. Kokai Tokkyo Koho JP 2002367674 A2 20021220, 9 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2001-175182 20010611.

AB The electrolyte solution has a Li salt dissolved in a solvent mixture containing

≥1 **nonaq.** solvent selected from carbonate esters, ethers and/or lactones; a dicarboxylate diester of the formula  $R1O2(CH2)nO2R2$  or  $R3O2(CH2)pCH:CH(CH2)qO2R4$  (excluding succinate diesters) [ $R1-R4$  = C1-10 alkyl or halogen substituted alkyl;  $n$  = an integer from 0-1 and 3-10;  $p$  and  $q$  = an integer from 0-5; and  $0 \leq (p+q) \leq 10$ ], or a derivative thereof; and an aromatic compound of the formula  $C6R1R2R3R4R5R6$  or  $R1OC6R2R3R4R5R6$  [ $R1-R6$  = H, halogen, C1-10 chain alkyl, C4-10 cyclic alkyl, or (substituted) phenyl], having mol. weight ≤ 500. The battery has the above electrolyte solution, a **cathode** containing a Li transition metal oxide, and a carbonaceous **anode**.

IC ICM H01M010-40

ICS H01M004-02; H01M004-58

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST lithium **battery electrolyte nonaq** solvent  
additive dicarboxylate diester

IT **Battery electrolytes**

(**electrolyte** solns. containing dicarboxylate diesters and aromatic compds. with controlled mol. weight for secondary lithium batteries)

IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 21324-40-3, **Lithium hexafluorophosphate**

RL: DEV (Device component use); USES (Uses)

(electrolyte solns. containing dicarboxylate diesters and aromatic compds. with controlled mol. weight for secondary lithium batteries)

IT 95-92-1, Diethyl oxalate 108-59-8, Dimethyl malonate 132-64-9, Dibenzofuran 872-36-6, Vinylene carbonate

RL: MOA (Modifier or additive use); USES (Uses)

(electrolyte solns. containing dicarboxylate diesters and aromatic compds. with controlled mol. weight for secondary lithium batteries)

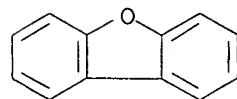
IT 132-64-9, Dibenzofuran

RL: MOA (Modifier or additive use); USES (Uses)

(electrolyte solns. containing dicarboxylate diesters and aromatic compds. with controlled mol. weight for secondary lithium batteries)

RN 132-64-9 HCA

CN Dibenzofuran (8CI, 9CI) (CA INDEX NAME)



=> d L59 1-13 cbib abs hitind hitstr

L59 ANSWER 1 OF 13 HCA COPYRIGHT 2003 ACS on STN

130:330015 Steady state voltammetry at low electrolyte/reactant concentration ratios: what it means and what it does not mean. Amatore, Christian; Thouin, Laurent; Bento, M. F. (URA CNRS 1679, Departement de Chimie, Ecole Normale Supérieure, Paris, 75231, Fr.). Journal of Electroanalytical Chemistry, 463(1), 45-52 (English) 1999. CODEN: JECHE5. ISSN: 0368-1874. Publisher: Elsevier Science S.A..

AB Voltammetric measurements performed at low [electrolyte]/[reactant] ratios are affected by migrational transport, as well as by ohmic drop contributions. The latter depend on the current as well as on the charge of the initial electroactive species because the local electrolysis changes the ionic composition in the vicinity of the **electrode**. Extraction of thermodyn. or kinetic data from wave shapes and positions is thus impossible without correction of these ohmic drop components. This work extends a previous exptl. approach for eliminating ohmic drop contributions from exptl. voltammograms obtained at low [electrolyte]/[reactant] ratios, by combining impedance measurements and voltammetric data. The results presented here confirm our previous independent conclusions that when the reactant is neutral, the variation of ohmic drop along the voltammetric curve (which reflect the progressive ionic enrichment of the diffusion layer) cannot be predicted by considering diffusional/migrational transport alone, but also requires consideration of the influence of natural convection.

CC 72-2 (Electrochemistry)

Section cross-reference(s): 76

IT Electric resistance

(of **electrolytic cell** with dicyano(fluoren-9-ylidene) methane solns. in DMF)

IT 486-25-9, Fluorenone

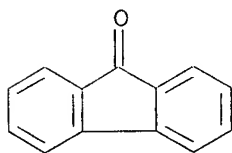
RL: PRP (Properties); RCT (Reactant); RACT (Reactant or reagent)  
(reaction with malononitrile with formation of dicyano(fluoren-9-ylidene) methane)

IT 486-25-9, Fluorenone

RL: PRP (Properties); RCT (Reactant); RACT (Reactant or reagent)  
(reaction with malononitrile with formation of dicyano(fluoren-9-ylidene) methane)

RN 486-25-9 HCA

CN 9H-Fluoren-9-one (9CI) (CA INDEX NAME)

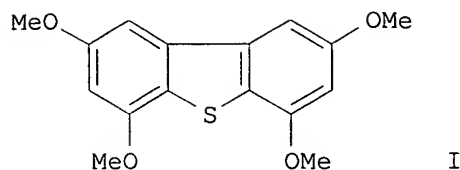


L59 ANSWER 2 OF 13 HCA COPYRIGHT 2003 ACS on STN

123:9282 Anodic oxidation of methoxylated dibenzothiophenes: isolation of stable cation radical salts. Cariou, M.; Douadi, T.; Simonet, J. (Lab. Electrochimie Organique, Univ. Catholique Ovest, Angers, 49008, Fr.). New Journal of Chemistry, 19(1), 65-76 (English) 1995. CODEN: NJCHE5. ISSN: 1144-0546. Publisher: Gauthier-Villars.

GI





AB Several dibenzothiophenes, e.g., I, substituted by electron-donating groups such as methoxy (or methylenedioxy) were synthesized with the object of converting them into stable cation radical salts by anodic oxidation. These methoxylated dibenzothiophenes were prepared from the relevant biphenyls, e.g., 3,5,3',5'-tetramethoxybiphenyl, either directly by reaction with  $\text{SCl}_2$  or indirectly by reaction with sulfur monochloride  $\text{S}_2\text{Cl}_2$  followed by an extrusion of sulfur. Among these derivs., 2,8-dimethoxydibenzothiophene, 2,3,7,8-tetramethoxydibenzothiophene, and 2,3:7,8-bis(methylenedioxy)dibenzothiophene exhibited, in cyclic voltammetry, a reversible first oxidation peak, but only the last two gave stable cation radical salts. These were isolated as deep blue crystals and characterized by ESR spectroscopy.

CC 27-9 (Heterocyclic Compounds (One Hetero Atom))

IT 132-65-0, Dibenzothiophene 274-09-9, Benzodioxole 634-36-6,  
1,2,3-Trimethoxybenzene 5460-32-2, 4-Iodoveratrole 6161-50-8,  
3,3'-Dimethoxybiphenyl 23149-33-9 49866-33-3 72470-94-1

RL: RCT (Reactant); RACT (Reactant or reagent)

(anodic oxidation of methoxylated dibenzothiophenes to stable cation radical salts)

IT 1702-67-6P 2026-27-9P 4791-89-3P, 5,5'-Bi-1,3-benzodioxole  
4791-91-7P, Thieno[2,3-f:4,5-f']bis[1,3]benzodioxole 5876-51-7P,  
5-Iodo-1,3-benzodioxole 6322-17-4P 25245-27-6P 25245-29-8P  
25245-37-8P 33198-85-5P 56772-00-0P 99323-85-0P  
108840-33-1P 163771-58-2P 163771-59-3P  
163771-60-6P 163771-61-7P

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)

(anodic oxidation of methoxylated dibenzothiophenes to stable cation radical salts)

IT 1013-23-6P, Dibenzothiophene 5-oxide 42065-33-8P  
163771-62-8P 163771-64-0P 163771-66-2P  
163771-68-4P 163771-69-5P 163771-70-8P

RL: SPN (Synthetic preparation); PREP (Preparation)

(anodic oxidation of methoxylated dibenzothiophenes to stable cation radical salts)

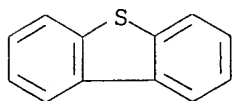
IT 132-65-0, Dibenzothiophene

RL: RCT (Reactant); RACT (Reactant or reagent)

(anodic oxidation of methoxylated dibenzothiophenes to stable cation radical salts)

RN 132-65-0 HCA

CN Dibenzothiophene (8CI, 9CI) (CA INDEX NAME)



IT 33198-85-5P 163771-58-2P 163771-59-3P

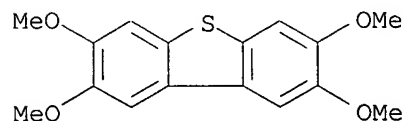
**163771-60-6P**

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)

(anodic oxidation of methoxylated dibenzothiophenes to stable cation radical salts)

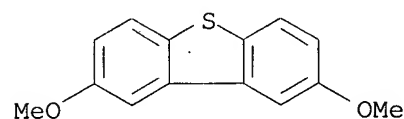
RN 33198-85-5 HCA

CN Dibenzothiophene, 2,3,7,8-tetramethoxy- (8CI, 9CI) (CA INDEX NAME)



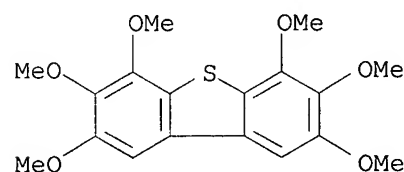
RN 163771-58-2 HCA

CN Dibenzothiophene, 2,8-dimethoxy- (9CI) (CA INDEX NAME)



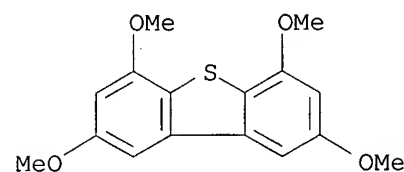
RN 163771-59-3 HCA

CN Dibenzothiophene, 2,3,4,6,7,8-hexamethoxy- (9CI) (CA INDEX NAME)



RN 163771-60-6 HCA

CN Dibenzothiophene, 2,4,6,8-tetramethoxy- (9CI) (CA INDEX NAME)



IT 42065-33-8P 163771-62-8P 163771-64-0P

163771-66-2P 163771-69-5P 163771-70-8P

RL: SPN (Synthetic preparation); PREP (Preparation)

(anodic oxidation of methoxylated dibenzothiophenes to stable cation radical salts)

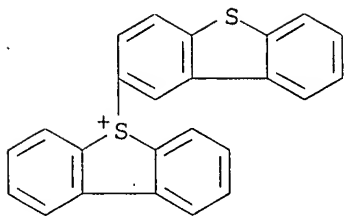
RN 42065-33-8 HCA

CN 2,5'-Bidibenzothiophenium, perchlorate (9CI) (CA INDEX NAME)

CM 1

CRN 48211-74-1

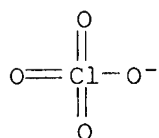
CMF C24 H15 S2



CM 2

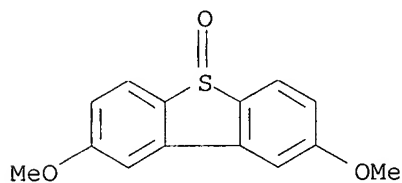
CRN 14797-73-0

CMF Cl O4



RN 163771-62-8 HCA

CN Dibenzothiophene, 2,8-dimethoxy-, 5-oxide (9CI) (CA INDEX NAME)



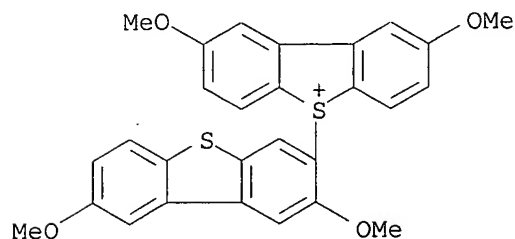
RN 163771-64-0 HCA

CN Dibenzothiophenium, 5-(2,8-dimethoxy-3-dibenzothienyl)-2,8-dimethoxy-, perchlorate (9CI) (CA INDEX NAME)

CM 1

CRN 163771-63-9

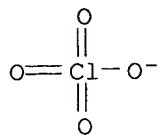
CMF C28 H23 O4 S2



CM 2

CRN 14797-73-0

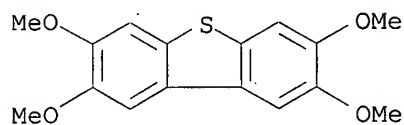
CMF Cl O4



RN 163771-66-2 HCA  
CN Dibenzothiophene, 2,3,7,8-tetramethoxy-, radical ion(1+), perchlorate  
(9CI) (CA INDEX NAME)

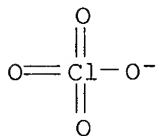
CM 1

CRN 163771-65-1  
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CCI RIS

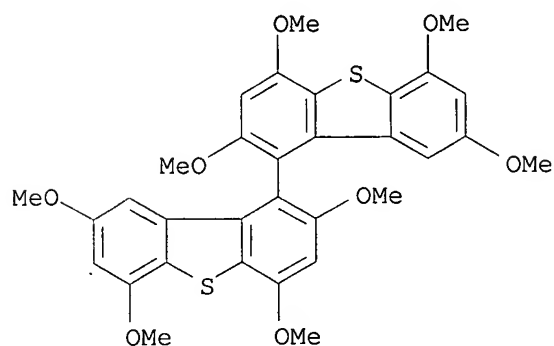


CM 2

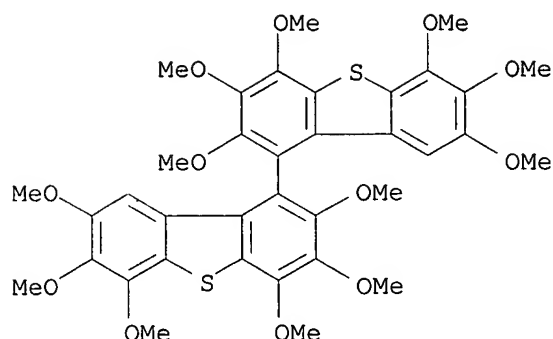
CRN 14797-73-0  
CMF C1 O4



RN 163771-69-5 HCA  
CN 1,1'-Bidibenzothiophene, 2,2',4,4',6,6',8,8'-octamethoxy- (9CI) (CA INDEX NAME)



RN 163771-70-8 HCA  
CN 1,1'-Bidibenzothiophene, 2,2',3,3',4,4',6,6',7,7',8,8'-dodecamethoxy-  
(9CI) (CA INDEX NAME)



L59 ANSWER 3 OF 13 HCA COPYRIGHT 2003 ACS on STN

121:120171 Effect of sulfur on anode reactivity and electrolytic consumption. Sorlie, Morten; Kuang, Zhan-ling; Thonstad, Jomar (Elkem a.s. Research, Kristiansand, N-4602, Norway). Light Metals (Warrendale, PA, United States) 659-65 (English) 1994. CODEN: LMPMDF. ISSN: 0147-0809.

AB CO<sub>2</sub> reactivity, air reactivity and electrolytic consumption of sulfur-doped anodes were studied in the laboratory. Sulfur was introduced into the anodes prior to baking by dissolving dibenzothiophene in the pitch or by substituting parts of the dry aggregate with a high-sulfur petroleum coke. The CO<sub>2</sub> reactivity decreases with increasing sulfur content within the sulfur concns. studied. A min. in air reactivity is observed at approx. 1.3 wt% S but increase rapidly with higher sulfur concns. in the anode. The dust generation with both CO<sub>2</sub> and air is significantly reduced in the sulfur concentration range 1.3-2.1 wt%. Total electrolytic carbon consumption, however, appears not to be very much influenced by the anode sulfur content.

CC 72-4 (Electrochemistry)

Section cross-reference(s): 49

IT 132-65-0, Dibenzothiophene

RL: PRP (Properties)

(carbon anode with sulfur prepared by adding)

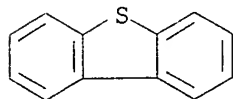
IT 132-65-0, Dibenzothiophene

RL: PRP (Properties)

(carbon anode with sulfur prepared by adding)

RN 132-65-0 HCA

CN Dibenzothiophene (8CI, 9CI) (CA INDEX NAME)



L59 ANSWER 4 OF 13 HCA COPYRIGHT 2003 ACS on STN

116:75322 Development and characterization of a titanium dioxide-based semiconductor photoelectrochemical detector. Brown, Garrett N.; Birks, John W.; Koval, Carl A. (Inst. Res. Environ. Sci., Univ. Colorado, Boulder, CO, 80309-0216, USA). Analytical Chemistry, 64(4), 427-34 (English) 1992. CODEN: ANCHAM. ISSN: 0003-2700.

AB The development and characterization of a flow-through semiconductor-based titanium dioxide photoelectrochem. detector for flow injection anal. and liquid chromatog. is described. The detector is nonselective, responding to a variety of organic analytes including amines, aromatic alcs., hydroquinones,

aldehydes, and furans with redox potentials less pos. than the valence band edge of the titanium dioxide semiconductor. An investigation of the illuminated photoelectrochem. and dark semiconductor electrochem. properties of the detector was carried out as a function of solvent system, electrochem. potential, and TiO<sub>2</sub> production variables. Illumination intensity, titanium oxidation temperature, and **electrode** potential controlled the magnitude of the photoelectrochem. currents. Duration of thermal oxidation and the amount of hydrogen doping determined the ratio of the light current to dark current for the analyte. Linearity over 2 orders of magnitude and detection limits in acetonitrile of 40 and 140 pmol, for p-aminoacetanilide and diethylamine, resp., were demonstrated. Illumination of the semiconducting TiO<sub>2</sub> wire **electrode** along a cylindrical electrochem. cell indicated the possible application of this spatially-resolved detection technique to whole column detection chromatog.

CC 80-2 (Organic Analytical Chemistry)

Section cross-reference(s): 72, 76

IT **Electrolytic cells**

(photoelectrochem., flow-through, titanium dioxide-based semiconductor)

IT 59-23-4, D-Galactose, analysis 90-15-3,  $\alpha$ -Naphthol 91-22-5, Quinoline, analysis 95-71-6, Methylhydroquinone 103-84-4, Acetanilide 103-90-2, Acetaminophen 108-10-1, 4-Methyl-2-pentanone 108-43-0, m-Chlorophenol 109-89-7, Diethylamine, analysis 110-63-4, 1,4-Butanediol, analysis 110-86-1, Pyridine, analysis 118-92-3, Anthranilic acid 122-80-5, p-Aminoacetanilide 123-08-0, 4-Hydroxybenzaldehyde 123-38-6, Propionaldehyde, analysis 132-64-9, Dibenzofuran 142-92-7, Hexyl acetate 156-43-4, p-Phenetidine 591-50-4, Iodobenzene 621-23-8 623-05-2, 4-Hydroxybenzyl alcohol 955-83-9, 2,5-Diphenylfuran 1083-48-3 5471-63-6, 1,3-Diphenylisobenzofuran 29743-08-6, N-(4-Ethoxybenzylidene)-4-butylaniline

RL: ANT (Analyte); ANST (Analytical study)

(detection of, by flow-injection anal. using titanium dioxide-based semiconductor photoelectrochem. detector)

IT 13463-67-7, Titanium dioxide, uses

RL: ANST (Analytical study); USES (Uses)

(**electrodes**, in photoelectrochem. detectors for flow-injection anal. and liquid chromatog.)

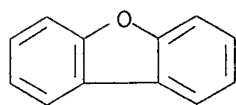
IT 132-64-9, Dibenzofuran

RL: ANT (Analyte); ANST (Analytical study)

(detection of, by flow-injection anal. using titanium dioxide-based semiconductor photoelectrochem. detector)

RN 132-64-9 HCA

CN Dibenzofuran (8CI, 9CI) (CA INDEX NAME)



L59 ANSWER 5 OF 13 HCA COPYRIGHT 2003 ACS on STN

111:30209 Electrochemical carboxylation of aliphatic, aromatic, and vinylic carbonyl compounds: advantage to using a sacrificial magnesium **anode**. Mcharek, Slah; Heintz, Monique; Troupel, Michel; Perichon, Jacques (Lab. Electrochim. Catal. Synth. Org., CNRS, Thiais, 94320, Fr.). Bulletin de la Societe Chimique de France (1), 95-7 (French) 1989 . CODEN: BSCFAS. ISSN: 0037-8968.

AB In the presence of CO<sub>2</sub> in DMF, the electroredn. of carbonyl compds. or

$\alpha,\beta$ -keto alkenes at high concentration yields  $\alpha$ -hydroxy acids and  $\beta$ -keto acids, resp. The use of a sacrificial Mg **anode** allows constant current electrolyses in a diaphragmless cell.

CC 72-4 (Electrochemistry)

Section cross-reference(s): 23, 24, 25

ST electroredn carbonyl compd magnesium sacrificial **anode**; redn electrochem aldehyde ketone; hydroxy keto acid formation electroredn; carbon dioxide carboxylation electrochem

IT Ketones, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)

(carboxylation of, electrochem., in DMF solution, with magnesium sacrificial **anode**)

IT Aldehydes, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)

(carboxylation of, electrochem., in DMF, with magnesium sacrificial **anode**)

IT 7439-95-4, Magnesium, uses and miscellaneous

RL: USES (Uses)

(**anode**, sacrificial, in electrochem. carboxylation of carbonyl compds.)

IT 68-12-2, Dimethylformamide, uses and miscellaneous

RL: USES (Uses)

(carbonyl compds. electrochem. carboxylation in, magnesium sacrificial **anode** in)

IT 78-59-1 98-86-2, reactions 100-52-7, Benzaldehyde, reactions

103-79-7 119-61-9, reactions 122-57-6 124-13-0, Octanal

486-25-9, 9H-Fluoren-9-one 504-20-1 625-33-2, 3-Penten-2-one

930-68-7, 2-Cyclohexen-1-one

RL: RCT (Reactant); RACT (Reactant or reagent)

(carboxylation of, electrochem., in solution of DMF containing carbon

dioxide

with sacrificial magnesium **anode**)

IT 76-93-7P, preparation 90-64-2P 467-69-6P 515-30-0P 4439-87-6P

6641-83-4P 15896-36-3P 16205-98-4P 25832-09-1P 91057-32-8P

121400-88-2P

RL: FORM (Formation, nonpreparative); PREP (Preparation)

(formation of, in electrochem. carboxylation of carbonyl compds. in... electrolytic cell with sacrificial magnesium **anode**)

IT 486-25-9, 9H-Fluoren-9-one

RL: RCT (Reactant); RACT (Reactant or reagent)

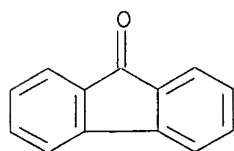
(carboxylation of, electrochem., in solution of DMF containing carbon

dioxide

with sacrificial magnesium **anode**)

RN 486-25-9 HCA

CN 9H-Fluoren-9-one (9CI) (CA INDEX NAME)

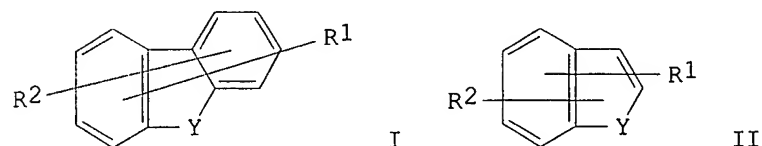


L59 ANSWER 6 OF 13 HCA COPYRIGHT 2003 ACS on STN

107:118317 Secondary batteries. Suzuki, Tetsuyoshi; Hasegawa, Kazumi; Fujimoto, Masahisa; Nishio, Koji; Furukawa, Saneshiro (Sanyo Electric Co., Ltd., Japan; Mitsubishi Chemical Industries Co., Ltd.). Jpn. Kokai Tokkyo

Koho JP 62110257 A2 19870521 Showa, 9 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1985-250388 19851108.

GI



AB Organic semiconductors of reaction products of NOmX (X = halogen-containing inorg. group, and m = 1 or 2) and I or II (R1, R2 = H, alkyl, alkoxy, aryl, aryloxy, thioether, amino, aldehyde, cyano, nitro group, or halogen; Y = NR3, O, S, or Se; and R3 = H, alkyl, or aryl) are used as **cathodes** and/or **anodes** for secondary batteries. A suspension of 11.68 g NOBF4 in 50 mL mol. sieve-dried MeCN was stirred in N at .apprx.20°, 16.70 g carbazole was added to the suspension, reacted for 2 h, rested overnight at .apprx.20°, mixed with MeOH, filtered, the solid was washed with MeOH, dried at 60° under reduced pressure to obtain a black C12.00H8.94N1.25F1.00 powder having an elec. conductivity of  $6.0 \times 10^{-5}$  S/cm. When cycled at 5-h charging at 1 mA and 1-mA discharging to 2.0 V cutoff, a Li battery using a **cathode** of this powder and a 1M LiBF4/propylene carbonate electrolyte had a charging-discharging efficiency of 94% at the 80th cycle whereas that of a Li-polyacetylene battery dropped sharply after 50th cycles.

IC ICM H01M004-60

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 27, 76

ST **cathode** nitrosyl tetrafluoroborate carbazole compd; battery  
**cathode** nitrosyl tetrafluoroborate carbazole

IT **Cathodes**

(battery, from reaction products of nitrosyl tetrafluoroborate and ... condensed-ring heterocyclic compds.)

IT 86-74-8D, Carbazole, reaction product with nitrosyl tetrafluoroborate  
 95-15-8D, Benzothiophene, reaction product with nitrosyl tetrafluoroborate  
 132-64-9D, reaction product with nitrosyl tetrafluoroborate  
 14635-75-7D, Nitrosyl tetrafluoroborate (NOBF4), reaction products with condensed-ring heterocyclic compds.

RL: USES (Uses)

(**cathodes**, for organic-electrolyte batteries)

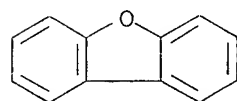
IT 132-64-9D, reaction product with nitrosyl tetrafluoroborate

RL: USES (Uses)

(**cathodes**, for organic-electrolyte batteries)

RN 132-64-9 HCA

CN Dibenzofuran (8CI, 9CI) (CA INDEX NAME)





L59 ANSWER 7 OF 13 HCA COPYRIGHT 2003 ACS on STN

100:195110 Zinc anodes for secondary alkaline batteries. (Toyota Central Research and Development Laboratories, Inc., Japan). Jpn. Kokai Tokkyo Koho JP 58178956 A2 19831020 Showa, 5 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1982-62038 19820414.

AB The title anodes are prepared with an active ingredient of Zn, ZnO, a Zn complexing agent (Zn collector), and a binder. A possible complexing agent is 2,3,7-trihydroxyfluorone [89595-14-2]. Thus, an active ingredient containing a Zn complexing agent was filled into a stainless steel mesh to prepare a Zn anode for a Ni-Zn battery. The battery had high discharge properties.

IC H01M004-42; H01M004-62

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

IT 89595-14-2

RL: USES (Uses)

(anodes containing, zinc, battery, high discharge-property)

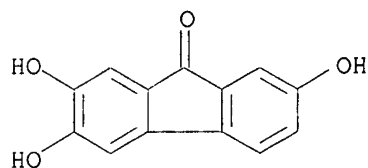
IT 89595-14-2

RL: USES (Uses)

(anodes containing, zinc, battery, high discharge-property)

RN 89595-14-2 HCA

CN 9H-Fluoren-9-one, 2,3,7-trihydroxy- (9CI) (CA INDEX NAME)



L59 ANSWER 8 OF 13 HCA COPYRIGHT 2003 ACS on STN

98:151659 Photoelectrochemical ESR. Part I. Experimental. Coles, Barry A.; Compton, Richard G. (Phys. Chem. Lab., Oxford Univ., Oxford, OX1 3QZ, UK). Journal of Electroanalytical Chemistry and Interfacial Electrochemistry, 144(1-2), 87-98 (English) 1983. CODEN: JEIEBC. ISSN: 0022-0728.

AB A flow system for simultaneous photoelectrochem. ESR studies is described. The relevant theory is presented and the sensitivity of the technique evaluated. Expts. involving the dye fluorescein are shown to be in good agreement with the theory. It is possible to generate radicals by irradiation of electrochem. generated species and to induce photochem. reactions by irradiation of electrochem. generated radicals.

CC 72-2 (Electrochemistry)

Section cross-reference(s): 22, 74, 77

ST photoelectrochem ESR; **electrode** reaction photochem ESR app; radical photoelectrochem formation ESR; fluorescein photoelectrochem redn ESR

IT **Electrolytic cells**

(for photoelectrochem. reactions, combined with ESR spectrometer)

IT Spectrometers

(ESR, with **electrolytic cell** for photoelectrochem. studies)

IT **Electrode reaction**

(photochem., apparatus for ESR study of)

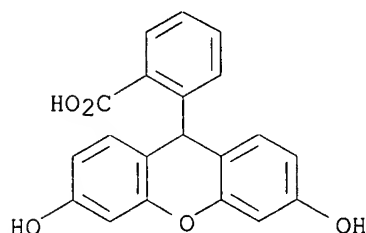
IT 7439-97-6, uses and miscellaneous

RL: USES (Uses)

(**electrode**, copper plated with, for fluorescein photoelectrochem. reduction, ESR in relation to)

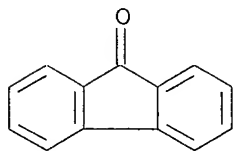
IT 518-44-5P 85209-52-5P

RL: PREP (Preparation)  
(formation of, electrochem., light effect on, ESR study of)  
IT 518-44-5P  
RL: PREP (Preparation)  
(formation of, electrochem., light effect on, ESR study of)  
RN 518-44-5 HCA  
CN Benzoic acid, 2-(3,6-dihydroxy-9H-xanthen-9-yl)- (9CI) (CA INDEX NAME)

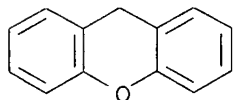


L59 ANSWER 9 OF 13 HCA COPYRIGHT 2003 ACS on STN  
95:88237 Electrochemical benzylic oxidations. Matlock, Paul L.; Sandner, Michael R. (Union Carbide Corp. , USA). U.S. US 4277318 19810707 , 6 pp. (English). CODEN: USXXAM. APPLICATION: US 1980-140610 19800415.  
AB Benzylic methylene groups of hydrocarbons having 7 to 30 C atoms are electrochem. oxidized to ketones in a membrane cell with the anolyte compartment using a biphasic aqueous organic solvent, a phase transfer catalyst in 1 phase, an alkylene halide in a 2nd phase, and a Mn compound. Thus, in a cell with a cation-exchanging membrane, a C rod **cathode**, and Pt gauze cylinder **anode**, KMnO<sub>4</sub> 0.3159, tetralin 3.74, tricaprilmethylammonium chloride (phase transfer catalyst) 0.48, tridecane 0.314 g, and methylene chloride 30 mL were added to 40 mL aqueous H<sub>2</sub>SO<sub>4</sub> in the **anodic** compartment. The **cathodic** compartment containing H<sub>2</sub>SO<sub>4</sub> and the **anodic** compartment were stirred and a 5 V d.c. was impressed across the cell for 24 h. The product was extracted with methylene chloride and anal. by gas liquid chromatog. indicated 0.280 g  $\alpha$ -tetralone. A 58% current efficiency was achieved after substrating the amount of  $\alpha$ -tetralone formed from KMnO<sub>4</sub>.  
IC C25B003-02  
NCL 204078000  
CC 72-8 (Electrochemistry)  
Section cross-reference(s): 25, 26  
IT 7440-06-4, uses and miscellaneous  
RL: USES (Uses)  
(**anode**, manganese oxide-coated, tetralin electrochem. oxidation on)  
IT 1313-13-9, uses and miscellaneous  
RL: USES (Uses)  
(coating of, on platinum **electrode**, tetralin electrochem. oxidation on)  
IT 51811-24-6  
RL: PRP (Properties)  
(membrane, in **electrolytic cell** for benzylic methylene group oxidation)  
IT 100-06-1P 100-52-7P, preparation 134-81-6P 451-40-1P 486-25-9P  
RL: IMF (Industrial manufacture); PREP (Preparation)  
(production of, electrochem., in presence of potassium permanganate)  
IT 486-25-9P  
RL: IMF (Industrial manufacture); PREP (Preparation)  
(production of, electrochem., in presence of potassium permanganate)

RN 486-25-9 HCA  
CN 9H-Fluoren-9-one (9CI) (CA INDEX NAME)



L59 ANSWER 10 OF 13 HCA COPYRIGHT 2003 ACS on STN  
94:38579 Silylation reactions applied to attachment of dye molecules to semiconductor electrodes. Armstrong, Neal R. (Dep. Chem., Michigan State Univ., East Lansing, MI, 48824, USA). Midland Macromolecular Monographs, 7(Silylated Surf.), 159-71 (English) 1980. CODEN: MMMODH. ISSN: 0141-0342.  
AB A permanent alteration of the properties of SnO<sub>2</sub> and TiO<sub>2</sub> electrode surfaces was accomplished. For the SnO<sub>2</sub> electrodes with both phthalocyanine and xanthene dyes it was possible to sensitize oxidation reactions with visible light. The silanes used were:  $\gamma$ -aminopropyltrimethoxysilane and N-( $\beta$ -aminoethyl)- $\gamma$ -aminopropyltrimethoxysilane. Erythrosin, fluorescein, and rhodamine B were bound to the surface via amidization using dicyclohexylcarbodiimide after the surface was silanized. Data show that the silane modified SnO<sub>2</sub> electrodes exhibit a markedly different electrochem. behavior toward xanthene dyes when voltammetric oxidation of solns. of the dyes is takes place.  
CC 72-7 (Electrochemistry)  
Section cross-reference(s): 40, 78  
IT 92-83-1D, derivs. 574-93-6D, derivs., metal complexes  
RL: PRP (Properties)  
(semiconductor **electrode** modification by, after silylation)  
IT 92-83-1D, derivs.  
RL: PRP (Properties)  
(semiconductor **electrode** modification by, after silylation)  
RN 92-83-1 HCA  
CN 9H-Xanthene (9CI) (CA INDEX NAME)



L59 ANSWER 11 OF 13 HCA COPYRIGHT 2003 ACS on STN  
89:200353 Rechargeable quinone battery for load levelling. Binder, H.; Knoedler, R.; Koehling, A.; Sandstede, G.; Walter, G. (Battelle-Inst. e.V., Frankfurt/Main, Fed. Rep. Ger.). Power Sources, 6, 643-53 (English) 1977. CODEN: POSOAN. ISSN: 0743-7137.  
AB A secondary battery system with solid quinones as active masses, which are insol. in acids, is described. Oxanthranol (anthrahydroquinone) [549-99-5] is used for the anode, and chloranil (tetrachloro-p-benzoquinone) [118-75-2] for the cathode. Overvoltage is small in the charge and discharge modes even at high c.densities. At a discharge rate of 10 h, >90% of the quinones can be utilized. For a lab model with a storage capacity of .apprx.20 mA-h/cm<sup>2</sup>, a current yield of .apprx.98 and an energy yield of .apprx.90% were measured at a discharge rate of

.apprx.10 h. Lifetime is not limited by deep discharges or quick recharges. After >100 cycles, electrodes with chloranil showed no loss in capacity.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

IT 549-99-5

RL: USES (Uses)

(**cathodes**, battery, load-leveling)

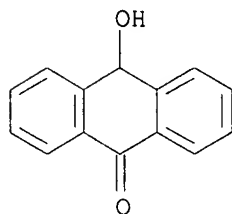
IT 549-99-5

RL: USES (Uses)

(**cathodes**, battery, load-leveling)

RN 549-99-5 HCA

CN 9(10H)-Anthracenone, 10-hydroxy- (9CI) (CA INDEX NAME)



L59 ANSWER 12 OF 13 HCA COPYRIGHT 2003 ACS on STN

84:66771 Effect of additives to the **anode** mass on its physicochemical properties. Yanko, E. A.; Lazarev, V. D.; Voronkov, M. G.; Deryagina, E. N. (USSR). Tsvetnye Metally (Moscow, Russian Federation) (10), 38-42 (Russian) 1975. CODEN: TVMTAX. ISSN: 0372-2929.

AB Comparative data are given for the effect of well-known and newly proposed additives on the physicochem. properties of the **anode** mass used in **electrolytic cells** for producing Al [7429-90-5]. The additives can increase the quality of the **anode** without large investments.

CC 72-5 (Electrochemistry)

ST **anode** aluminum prodn additive

IT **Anodes**

(for aluminum production, effect of treatment on)

IT Anthracene oil

(in **anode** treatment, for aluminum production)

IT 7429-90-5P, preparation

RL: PREP (Preparation)

(**anodes** for, effect of chemical treatment on)

IT 7647-01-0, uses and miscellaneous 7664-93-9, uses and miscellaneous

7697-37-2, uses and miscellaneous 7704-34-9, uses and miscellaneous

7705-08-0, uses and miscellaneous 7783-20-2, uses and miscellaneous

7784-18-1 10043-35-3, uses and miscellaneous 12640-60-7 58128-61-3

RL: USES (Uses)

(in **anode** treatment, for aluminum production)

IT 81-11-8 104-15-4, uses and miscellaneous 110-02-1 121-57-3

132-65-0 139-66-2 1310-73-2, uses and miscellaneous

RL: PRP (Properties)

(in **anode** treatment, for aluminum production)

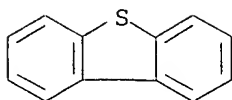
IT 132-65-0

RL: PRP (Properties)

(in **anode** treatment, for aluminum production)

RN 132-65-0 HCA

CN Dibenzothiophene (8CI, 9CI) (CA INDEX NAME)



L59 ANSWER 13 OF 13 HCA COPYRIGHT 2003 ACS on STN

81:5266 Anode mass for lead storage batteries. Ziegler, Siefried; Gladen, Rolf (Bosch, Robert, G.m.b.H.). Ger. Offen. DE 2232407 **19740110**, 15 pp. (German). CODEN: GWXXBX. APPLICATION: DE 1972-2232407 19720701.

AB The anode mass for Pb storage batteries contains as the expander one or several quinones (p-benzoquinone, quinhydrone, naphthoquinone, or phenanthrenequinone), hydrogenated quinones (cyclohexanol, cyclohexanone, 1,4-cyclohexanedione, 1,2,3,4-tetrahydronaphthalene,  $\alpha$ -tetralone, indan, or anthrone) or substituted quinones such as anthraquinone dyes (alizarin or indanthrene) in amts. of 0.05-1%. Such an expander gives more reproducible results than one based on lignin, in particular with respect to high-current capacity.

IC H01M

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

IT 84-11-7 84-65-1 **90-44-8** 106-34-3 106-51-4, uses and miscellaneous 108-93-0 108-94-1, uses and miscellaneous 119-64-2 130-15-4 496-11-7 529-34-0 637-88-7

RL: USES (Uses)

(lead **anode** expanders)

IT **90-44-8**

RL: USES (Uses)

(lead **anode** expanders)

RN 90-44-8 HCA

CN 9(10H)-Anthracenone (9CI) (CA INDEX NAME)

